Siberia. The cross between the yak and common ox has the advantage of thriving in a milder climate than that of the mountainous region of the yak. Dr. Hartmann also continues (No. 2) his summary of the available information as to "Lake Dwellings," here discussing their cultivation and preparation of grain and other vegetables. He reaffirms the usual conclusion that the cultivated plants of the lake dwellers of Central Europe indicate connection with the Mediterranean and even Africa. Perhaps the most remarkable point in the paper is the comparison of their large earthen jars for store corn, and their stone grain rubbers for mealing it, with similar jars and grain rubbers in modern Africa.—Prof. Meinicke's "Remarks on Wallace's Views as to the Population of the Indian Islands" are written in strong opposition to the English naturalist's theory as to the ethnological relations of Malays, Polynesians, and Papuans. With regard to Mr. Wallace's argument from contrast of the Malay character with the Papuan as proving difference of race, Prof. Meinicke argues that the Malay's courtesy and reserve may not be a race-character at all, but an effect of conversion to Mohammedanism; while revenge and bloodthirstiness belong to some Papuans as much as to Malays. In opposition to Mr. Wallace's view of Malays and Papuans being two distinct races, and of the Moluccas being largely populated by their intermixture, Prof. Meinicke claims the natives of the Moluccas as intermediate varieties forming a link of connection between the extreme Malay and Papuan types. As to the relation between Malays and Polynesians, Prof. Meinicke maintains the old and generally received view of an ethnological connection between them.—It is good evidence of the activity with which the science of man is now being pursued that Dr. W. Koner's useful bibliography of Anthropology, Ethnology, and Prehistoric Archæology for 1869-70 extends to twenty pages of the journal.—Dr. Bastian's review of Darwin's "Descent of Man," expressing high admiration for its hypothetically-arranged evidence as a contribution to science, protests against the exaggeration of Darwinism, or rather, the return to Lamarckism prevalent among too impetuous followers of the development theory.

IN the July number of the *Geological Magazine* (No. 85) the editor, Mr. Woodward, publishes a most interesting summary of the evidence extant as to the existence of limbs in the Trilobites, with a discussion of the significance of a remarkable specimen of *Asaphus*, lately described by Mr. Billings in the *Quarterly Journal of the Geological Society*. From a personal examination of the specimen, Prof. Dana was led to declare that the objects described by Mr. Billings as legs were merely calcified portions of the ventral integument destined to support branchial appendages. Mr. Woodward shows, and we think satisfactorily, that Prof. Dana is in error here. This valuable paper is illustrated with a plate contrasting the lower surface of Mr. Billings's Trilobite with that of the Norway lobster.—Mr. Hull contributes some observations on the general relations of the drift deposits of Ireland to those of Great Britain, in which the author confirms and extends the views adopted by Prof. Harkness as to the correlation of the Irish drift deposits with those of Britain, and the accordance of the whole with the principles laid down by Mr. Searles V. Wood, jun. A tabular statement of the phenomena of the three stages of the drift period in Britain concludes this paper.—From Mr. G. A. Lebour we have a note on the submergence of Is in western Brittany, in which, after referring to a Breton tradition that a town named Is was submerged in the Bay of Douarneney some fifteen hundred years ago, he adduces certain evidence to show that a gradual depression is taking place along this coast. He notices a submerged forest in the small Bay de la Forêt.—Mr. Mackintosh continues his paper on the drifts of the west and south borders of the Lake district; Mr. A. G. Cameron describes the recently-discovered caverns at Stainton in Furness; and Mr. J. E. Taylor discusses the relation of the Red to the Norwich Crags.

THE first part of the fourteenth volume of the *Atti della Società Italiana di Scienze Naturali*, published in April of the present year, contains only three papers, more than one-third of its pages being occupied by the annual report, list of members, &c. The papers are a description of a new species of Dalmatian shell, by MM. A. and G. B. Villa, to which the authors give the name of *Clausilia de Cattaniæ*; a long memoir on rennet and caseification, by M. C. Besana, and a short notice by Dr. C. Marinoni, of some new prehistoric remains collected in Lombardy.

SOCIETIES AND ACADEMIES

LONDON

Geologists' Association, July 7.—Prof. Morris, vice-president, in the chair. Mr. J. R. Pattison read a paper "On the Upper Limits of the Devonian System." The author did not wish to reopen the controversy which had taken place between the late Prof. Jukes and the supporters of the classification of the older geologists, but simply to lay before the Association a few facts as a prelude to a more complete paper which he hoped to bring forward during the next session. Mr. Pattison referred at some length to the fauna of the continental Devonian rocks, and strongly opposed the view recently put forward, that the Petherwin series is Lower Devonian and not Upper as generally supposed. He quite agreed with the older geologists in their classification, and concluded by recommending the sections exposed in North Devon to the attention of young geologists.—After some remarks by Prof. Tennant, Mr. Henry Woodward, and Mr Lobley, Prof. Morris described the distribution of the Devonian rocks throughout Europe, and remarked on the absence of vertebrate remains in the Devonian rocks of the South of England, in which corals and brachiopods abound, and the abundance of vertebrate remains in the Devonians or Old Red sandstones of Scotland, in which neither corals nor brachiopods have been detected. In the province of Oranburg, in Russia, however, the Devonian rocks contain both a vertebrate and a molluscan fauna.—A note "On a New Section of the Upper Bed of the London Clay," by Mr. Caleb Evans, drew the attention of the Association to an interesting exposure of a very fossiliferous bed of the London clay at Child's Hill, Hampstead. From an inconsiderable excavation at this place, Mr. Evans had collected in a short time twenty-three species, chiefly gasteropoda, in a fine state of preservation. This bed Mr. Evans considers to be the uppermost bed of the London clay, and immediately underlying the Bagshot sands, which form the summit of Hampstead Heath.

MAURITIUS

Meteorological Society, April 28.—The Honorable Colville Barclay, vice-president, in the chair.—The following letters and publications were laid upon the table:—1. A letter from Mr. James Duncan, Government Surveyor, forwarding a copy of observations taken at the Survey Camp, Vacoas, during the month of March last, at about 1,850 feet above the sea-level. 2. A letter from Mr. G. Jenner, Rodrigues, forwarding observations taken there in December, January, February, and March last. 3. From Mr. F. Timperley, Pamplemousses, giving a description of a meteor seen by him on the 22nd March. 4. Queensland Observations for October, November, and December 1870, by Mr. Edmund MacDonnell. 5. Singapore Observations for January 1871, by Dr. H. L. Randell.—"On the Converging of the Wind in Cyclones." The Secretary read the following letter addressed to him on the above subject by Captain Douglas Wales, Harbour Master:—"Some remarks of yours respecting the uncertainty of the real position of the centre of a cyclone set me thinking, and I send you a few ideas on the subject, which, as a sailor, I think worthy the serious attention of seamen, and the correctness of which they may put to the test of experience, whenever they have opportunities of doing so. Allow me to premise that I have no intention of dogmatising. I believe our knowledge of the cause of these fearful tempests, of their origin, their progress in this or that direction, their rate of progression, their recurving, the reasons of those recurvings, and their ultimate dispersion, to be still in its infancy. No doubt, the knowledge already acquired has saved many a good ship from becoming entangled in these storms, especially ships approaching them on their equatorial sides; but at the same time it must be admitted that more than one intelligent seaman, who thought himself well up in the subject, has actually run into the very centre of a cyclone, when, by all known rules, he ought to have been certain of avoiding it. There must be some reason for such an error, and it is that reason that I have been seeking for, and which, I trust, I have to some extent discovered. I send you a diagram on a large scale, which will explain my views more clearly than any written description. I assume that within a diameter of 40, 50, 60, 70, or 80 miles, a true circular storm of terrific violence must be found in every so called hurricane, and that to a considerable distance outside and around this central and circular storm winds are to be found gradually decreasing in force from 11, near the outer edge of the

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central storm, to 7 and 6, at the outer edge of the bad weather, but which, instead of blowing in ever enlarging circles farther and farther out from one common centre, are always converging to that centre, and on all sides gradually increasing, until, at a certain distance from the central calm, they acquire the force of a hurricane (12), and thence inwards blow with great violence in what, in all probability, is as nearly as may be a circle. It is these converging lines of wind that are, I think, likely to lead men into error as to the position of the centre of the storm. In the remarks I make I shall, to prevent confusion, confine myself to cyclones south of the equator, every one acquainted with the cyclonic theory knowing that the inverse of rules for the guidance of seamen in the southern hemisphere will be the rules for their guidance in the northern hemisphere. Let us suppose that a ship bound to Europe arrives at the point marked * in the outer converging curve traced on my diagram, the wind being N.E. with force 7, that is, double reefs and jib—barometer falling, sky overcast, confused swell, and, in short, every appearance of bad weather—lat. 12° S., long. 70° E.—What ought her commander to do? 'Heave to on the port tack,' says one, 'and wait for the weather to clear.' 'Run to the S.W.,' says another, 'and make use of the storm.' Being a pushing fellow, he makes up his mind to run, and, truth to say, there are as many reasons for approving that proceeding as for finding fault with it. If he succeeds in making use of the hurricane, he is considered a smart fellow; if he runs into it, and is dismasted or worse, 'rash,' 'headstrong,' 'ignorant,' &c., are the best terms he can look for; and yet he might as easily have been wrong in heaving to as in running. The wind being N.E., he infers that the centre bears N.W. He considers that the barometer and weather indicate that he is on the S.E. edge of a cyclone—the N.E. wind upon which he is running forming part of a circular storm, and that necessarily the centre is N.W. of him. Considering, further, that in that lat. and long. the storm is probably travelling W.S.W., he thinks that if he runs S.W. he will be diverging from it, and, that by making use of the storm he will get fine runs perhaps for days to come. But if the N.E. wind be only converging towards the fearful storm raging near the centre, that centre, in the first place, bears W. by N. ½ N., instead of N.W., so that the vessel, by steering S.W. is not diverging from the centre, as was supposed, but is really drawing nearer to it. In due time the weather gets worse from this very cause; the wind veers more to the eastward, the barometer continues to fall, and the captain begins to doubt whether the storm may not after all be progressing more to the southward than he supposed; whether, indeed, it may not, although so far to the eastward, be actually recurving, and he naturally becomes anxious and uncertain what to do. If he decides on running at all risks, he finds the wind still drawing at first more and more easterly, and then more and more southerly, always increasing in fury, and the sea becoming more and more heavy and tumultuous. But run he must now, and he must run dead before it, and being on what I have supposed a line of wind converging to a centre, he finishes by getting into the real hurricane, and loss and disaster are imminent. He may, however, if his ship be tight and staunch and runs well, get round to the N.W. side of the storm, and so get clear, probably with loss of spars and sail; but he has clearly run into what he was running to avoid, because he was under the impression that winds within the influence of a cyclone, although far from its centre, blew in circles round that centre, the wind everywhere clearly indicating the exact, or nearly exact, position of that centre. These opinions I submit with very great diffidence for the consideration of seamen and cyclonists. I am not going to attempt the setting up of any dogmatic theory of my own, but I am inclined to think this theory of converging winds will probably account for the manner in which many vessels have become entangled in hurricanes when seeking to avoid them according to cyclonic rules. Like all other theories on this very important subject, it requires very careful consideration; but there can be no possible risk in deducing from it the rule that vessels on approaching what the barometer, the state of the weather, and the force of the wind, clearly indicate as the dangerous side of a cyclone, should, in seeking to avoid it, keep the wind quite four points on the port quarter. With the wind thus free, a fast ship would run with great rapidity through the water, and, unless the storm were advancing on her in a direct line, would be always increasing her distance from its centre, and getting into finer weather, and, in any case, would have a very good chance of running across its track and thus avoiding it. Ships running into cyclones on their equatorial sides are to a very great extent without excuse. There are, however, some exceptional instances; but they are very rare." The chairman, in thanking Captain Wales for his interesting and valuable communication, expressed the hope that the important suggestions it contained would be taken advantage of by seamen, and prove to be serviceable to them in their attempts to avoid the dangerous parts of cyclones. The diagram prepared by Captain Wales fully explained how it might happen that a vessel, by seeking to keep away from the centre of what was considered a circular storm, would be actually running into it. The secretary was glad that the subject had been taken up by a sailor of long experience and of great practical knowledge and skill, and he had no doubt that Captain Wales's remarks would receive the serious attention they merited. In various papers published during the last fifteen years, he (the secretary) had often called attention to the incurving of the wind in cyclones, and to the losses occasioned by acting upon the supposition that the bearing of the centre was at right angles to the direction of the wind; and he believed that it was now beginning to be admitted that the movement of the air in a cyclone was not at all represented by concentric circles, but by a figure similar to that sketched by Captain Wales. The description given by Captain Wales of the way in which vessels might get involved in a cyclone, whilst acting according to accepted rules, applied to many cases which actually occurred. Captain Wales had framed a practical rule based upon observed facts, and it was for seamen to test its value.

PARIS

Academie des Inscriptions et Belles Lettres, July 14. Two seats of *associés libres*, vacant by the death of MM. Prosper Merimée and Deheque, have been filled at the recent sittings. M. Merimée's seat was given to M. de Robert, and M. Deheque's to M. Thomas Henry Martin, director of the Academy at Rennes. This gentleman has written many valuable volumes on interesting points of history; among others, "On the Physical Opinions of the Greeks and Romans." He was one of the few French savants opposed to M. Chasles' famous letters of Newton, and has written a pamphlet on the subject.

Academie des Sciences, July 17.—M. Faye in the chair. A committee was appointed to discuss the respective merits of several candidates for a free associate membership. The committee was composed of MM. Combes and Bertrand for the section of mathematical sciences, MM. Chevreul and Boussingault for the section of physical sciences, MM. Raulin and Bussy for the free members. The chairman of the committee is *de jure* M. Faye. When a report is to be drawn on the respective merits of ordinary members, the committee is composed from the section to which the late member belonged in his lifetime. In the secret committee held after the public sitting, a discussion was raised as to several candidatures, and it was impossible to come to any definite conclusion.—M. Lacaze Duthiers, a professor at the museum, who claims a seat in the section of zoology, read a paper on a new organ of nervous power which he has discovered in certain gasteropods living in water. This organ is placed behind the œsophagus, and at all events its dimensions are very small indeed. The Academy has appointed a committee to report on the prize Bordin, which is to be awarded this year for the best paper on the function of the stomata in the leaves of plants.—On the 3rd of October, 1870, M. Egger proposed the translation of the four books on Optics by Ptolemy, which were translated from Arabic into Latin, and of which two copies exist amongst the MSS. in the National Library. This suggestion was not lost, as the Royal Academy of Turin passed a resolution to raise the funds required for its publication. Other copies of the same Latin translation are also to be found in the Ambrose Library at Milan, and will be used for the purpose. The translation is very difficult, having been unsuccessfully attempted once in Italian, and once in French.—M. Leverrier presented a report on the observation of falling stars, for August 1869. The phenomenon was observed in twenty-seven different stations, viz. Agde, Barcelona, Bordeaux, Chartres, Chebli (Algiers), Genoa, Grenoble, Le Guerche (Cher), Larenore (Basses Pyrenées), Le Mans, Lyons, Marseilles, Mer (Loire et Cher), Metz, Moncalieri, Montpelier, Nice, Orange, Perpignan, Rochefort, Sainte Honorine (Calvados), Toulon, Toulouse, Tremont, Turin, Valencia. Observations were made by competent observers with correct chronometers, and special maps prepared by the Association Scientifique de

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France, of which M. Leverrier is now the chairman. The discussion on the observations is a long work which is not yet finished in consequence of the late war. The observations could not be completed in 1870, but the Association Scientifique de France is resuming its labours, and will be ready to make observations by August 1871 on the former principles.—M. Leverrier sent the description of a bolide observed at 10h. 6m. in the afternoon, 1° 30′ higher than σ Andromedæ, and exploding in Pegasus. He asks for some observations from the astronomical public.—The same question is put as to a magnificent falling star seven times larger than Jupiter observed by M. Chapelas 11h. 12m. in the afternoon, on the 18th July, from ξ Pegasus to the horizon in the north-west. It must have been seen in England.—At the last sitting we omitted to mention the presentation of some grains of wheat, &c., burned by electricity in a storm, a few years ago and preserved as a great curiosity.—M. Bert, Professor of Physiology at the Museum, formerly a prefect of Lille during the latter part of the war, sent a most interesting paper on the influence that the diminution of pressure exerts on animal life. Living frogs were placed under the air-pump, and proved to be killed very soon if pressure is diminished quickly to seven or eight inches, but if diminished gradually, they can live in a more perfect vacuum if proper precautions are taken to renew the residual air offered to them for respiration. Certainly the same thing can be said of aëronauts, who cannot reach a high level without inconvenience, except by very gradual ascent.—M. Dumas presented a small pamphlet from M. Janssen, narrating his ascent on December 2 with Volta. Dr. Janssen was himself the aëronaut, and his ascent was the occasion of some interesting observations. He was appointed a commissioner for visiting the meteorological establishments in England, and reporting upon them, and is now on his way to London.—M. Beaugrand, an engineer in the Parisian hydraulic service, presented a report on Roman aqueducts. He has written a very long essay on the matter, which would have been burned by the Communists with his office at the Hotel de Ville, if he had not brought it home on purpose to write out of it a paper for the Academy.

VIENNA

Imperial Academy of Sciences, April 13.—Prof. von Reuss reported on the fossil remains of a crab found in the Leithakalk of the Rauchstallbrunn pit near Baden. The fossil most nearly approaches the living genera *Actæon* and *Dairu*.—Prof. A. von Waltershofen reported on a new thermopile of great efficacy.—Prof. V. Graber communicated a memoir on the physiology and minute anatomy of insects, especially the Pediculina, in which he treated chiefly of the Malpighian vessels and tracheæ. The former in many cases consist merely of prolongations of the peritoneal membrane.—Prof. V. von Lang presented a memoir containing researches upon the influx of gases, undertaken for the purpose of testing the laws which have been established for the dependency of inflowing gases upon the pressure.—Prof. C. von Ettingshausen presented a first memoir upon the flora of Sagor in Carniolia, in which he described numerous species of fossil plants from the brown coal of that locality. This memoir included the Thallophytes, vascular Cryptogams, Gymnosperms, Monocotyledons, and Apetalæ. The Thallophytes include a *Sphæria* nearly allied to the Greenland species, and a *Laurencia*, which is the only marine plant found in the deposit. Of the Coniferæ *Glyptostrobus europæus* and *Sequoia Couttsiæ* are the most abundant, and of the latter genus three other species occur. A *Cunninghamia*, very like *C. sinensis*, is remarkable as adding a new genus to the Tertiary flora. Grasses are rare, but Naiadæ are abundant and remarkable. A *Pandanus* and a species of palm occur. Among the Apetalæ the author noticed two species of *Casuarina*, one of which is new and allied to *C. quadrivalvis*. The other orders represented are Myricaceæ 3 species, Betulaceæ 6, Cupuliferæ 15, Ulmaceæ 4, Celtideæ 2, Artocarpeæ 2, Salicineæ 2, Nyctagineæ 1, Monimiaceæ 1, Santalaceæ 4, Daphnoideæ 2, Proteaceæ, 21, Moreæ 19, and Laurineæ 18.—Prof. Carl Koritska exhibited and explained a hypsometrical map of the Alban Mountains, with profiles and views. He regarded the district as particularly instructive, from the intimate collocation of the three forms of volcanic craters and their apparent transition one into the other which prevails there.—Dr. E. Klein communicated a contribution to the knowledge of the Malpighian corpuscles in the human kidney, by Dr. Victor Seng; and a contribution to the knowledge of the finer nerves of the buccal mucous membrane, by Dr. E. Elin.—Prof. Ludwig Boltzmann presented a memoir containing several propositions on the equilibrium of heat, and another on the main proposition of the mechanical theory of heat.—Prof. E. Weiss furnished the elements and ephemeris of the comet discovered by Winnecke at Carlsruhe on the 7th April.

April 20.—Prof. C. von Ettingshasuen presented a memoir on the leaf-skeleton of the Loranthaceæ.—Prof. Simony noticed some peculiarities of the glaciers of the Dachsteingebirge. The Gosau glacier descends to an elevation of 6030 feet, the Hallstatt glacier to 6115 feet, and the Schladminger Ferner to 6935 feet. The most instructive moraine phenomena are presented by the lower part of the Hallstatt glacier.—Prof. Seeger presented a memoir on the methods at present employed for detecting small quantities of sugar in the urine, which he regards as unsatisfactory.—A paper on the perforations in the vessels of plants, by Dr. Tangl, was communicated by Prof. Ad. Weiss.

April 27.—Prof. Lang communicated some remarks on the abnormal dispersion observed by Christiansen and Kundt in solutions of fuchsine, cyanine, &c. He showed that the appearance is due to the defective achromatism of the human eye.—M. F. Schwackhöfer reported on the occurrence and mode of formation of phosphorite balls in Russian Podolia. He stated that these balls were originally carbonate of lime formed by concretion, and converted into phosphate of lime formed by the lixiviation of the Silurian clay slate in which they occur, which contains phosphoric acid. The analysis of these balls led to the formula $3\,(Ca^3\,P^2\,O^8) + Ca\,Fl^2$, agreeing with that of apatite in the proportion of fluorine.

PHILADELPHIA

American Philosophical Society, April 21.—Dr. Genth described the results of recent investigations by himself into Corundun pseudomorphs of Hersinite, an aluminate of oxide of iron, from specimens from Bengal. He reported finding specimens of Hersinite in N. Carolina Corunduns, and believes the emery of Massachusetts is to be referred to the same mineral. In Chester County, Penna., "Corundun pseudomorphs" occur which are quite soft like talc or scaly talc, which prove to be Margarite. A third pseudomorph very much foliated has not yet been determined.—Prof. Cope presented a paper entitled, "A preliminary report on the Vertebra discovered in the Port Kennedy Cave."—Prof. Cresson stated that the young and tender shoots of the *Symplocarpus fœtidus* (skunk cabbage) had forced themselves through a solid asphaltum composition pavement two inches in thickness in many places in "Belmont Glen," Park. The road was used for heavy hauling at the time.—Prof. J. P. Lesley described a discovery which he had made in East Tennessee of a sharp anticlinal axis crossing the coal measures of the Cumberland Mountains at right angles to the dominant system of disturbances, and showed its important bearing on the question of the conversion of the northern anticlinals of the Alleghanies, into the southern system of downthrows. Also its relationship to the latter and to the cross undulations worked out by Joseph Lesley in his instrumental survey of E. Kentucky thirteen years ago; and to the N.W.-S.E. system of faults described by Owen, Hall, and other geologists in the Valley of the Mississippi.

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